leveling rod based on the pitch obtained by said pitch computing means, without scanning a targeted area for focusing; and

fine adjusting means for moving said focusing lens to a position corresponding to said distance.

REMARKS

The Office Action dated October 3, 2002, has been received and carefully noted. The above amendments and the following remarks are submitted as a full and complete response thereto.

Claims 1-3 are pending. By this Amendment, claims 1 and 3 have been amended. No new matter is presented by the claim amendments. Thus, claims 1-3 are respectfully submitted for consideration.

Claims 1-3 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Kumagai et al. (U.S. Patent No. 5,742,378). The rejection is respectfully traversed because Kumagai et al. fails to disclose, teach or suggest each and every feature recited in the rejected claims.

Claims 1 and 3 each recite an automatic focusing mechanism for mounting on a measuring device having a telescope for sighting a leveling rod with pattern marks marked thereon at an equal pitch between each mark, and a photoelectric device for converting an image sighted to thereby automatically adjust a focus on the leveling rod.

In addition claim 1 recites a driving means for moving a focusing lens of said telescope from one end toward an opposite end of a movable range of said focusing lens, a pitch computing means for obtaining the pitch of the pattern marks of only a portion of the leveling rod at the position on said photoelectric device which is capable

of obtaining the pitch in a state before said focusing lens is focused on the leveling rod to thereby obtain a distance to the leveling rod based on the pitch obtained by said pitch computing means, without scanning an entire targeted area for focusing. Also, claim 1 recites a fine adjusting means for moving said focusing lens to a position corresponding to the distance.

In contrast to the apparatus disclosed by Kumagai et al., the focusing mechanism recited in claim 1 does not require scanning the entire target area.

Kumagai et al. discloses focus correction by moving the focusing lens with all target areas covered (scanned) in obtaining the maximum value of the peak of the frequencies acquired by performing a Fourier transform on a signal from the staff (Column 12, lines 16-46). The focusing operation of Kumagai et al is described with a series of steps. First, the focusing controller 1665 in the computation means 16 operates on the driver 17 to move the internal lens 112 from its infinity position toward the nearer position at a certain speed. The expiration of a prescribed time length is judged, and on detecting the time expiration, data is fetched from the linear sensor 15. Next, the computation means 16 implements the Fourier transformation for the data, and the result is compared with the previous result, thereby judging whether or not the output level of Fourier transformation has passed the peak value. If the passage of the peak value is detected, the focusing controller 1665 operates on the driver 17 to stop the internal lens or otherwise the sequence returns to step 2 (Column 12, lines 17-30).

After the internal lens 112 is stopped the focusing controller operates on the driver to move the internal lens toward the infinity position at a certain speed. Then data is fetched from the linear sensor, and it is rendered the Fourier transformation by the

computation means. The result is compared with the previous result thereby judging whether or not the output level of the Fourier transformation has passed the peak value. Upon detecting the passage of the peak value, i.e., the detection of the in-focus state, the focusing controller operates on the driver 17 to stop the internal lens or otherwise continue the focusing operation (Column 12, lines 31-43).

Consequently, in Kumagai et al, the leveling apparatus focuses the scale pattern of the leveling staff by detecting the peak value of the Fourier transformation output. To conduct the above focusing operation, Kumagai et al. necessarily requires scanning the entire target area.

In contrast, the current invention, as recited in claim 1 and discussed above, does not require scanning the entire target area. Moreover, the focusing mechanism as recited in claim 3 does not require any scanning for focusing.

Claim 3, in addition to the features discussed above, also recites a driving means for moving a focusing lens of said telescope to a predetermined position within a movable range of said focusing lens. Consequently, because the pitch of the pattern can be obtained for the range of the depth of focus when the focusing lens is set in a predetermined position, no scanning for focusing is required.

Therefore, claims 1 and 3 are patentable over Kumagai et al. Thus, Applicants respectfully request withdrawal of the rejection of claims 1 and 3 under 35 U.S.C. §102(b).

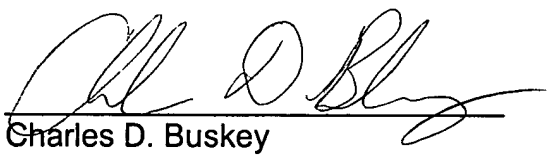
Claim 2 depends from claim 1 and is therefore patentable for at least the same reasons discussed above with respect to claim 1.

Accordingly, the Applicants respectfully request allowance of claims 1-3 and the prompt issuance of a Notice of Allowability.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to Counsel's Deposit Account No. 01-2300 making reference to Attorney Docket No. 101136-00013.

Respectfully submitted,



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Enclosure: Marked-Up Copy claims 1 and 3

MARKED-UP COPY OF THE CLAIMS

1. (Twice Amended) An automatic focusing mechanism for mounting on a measuring device having a telescope for sighting a leveling rod with pattern marks marked thereon at an equal pitch between each mark, and a photoelectric device for converting an image sighted by said telescope into an electric signal with a set range to thereby automatically adjust a focus on the leveling rod, said mechanism comprising:

driving means for moving a focusing lens of said telescope from one end toward an opposite end of a movable range of said focusing lens;

pitch computing means for obtaining the pitch of the pattern marks of only a portion of the leveling rod at that position on said photoelectric device which is capable of obtaining the pitch in a state before said focusing lens is focused on the leveling rod to thereby obtain a distance to the leveling rod based on the pitch obtained by said pitch computing means, without scanning an entire targeted area for focusing; and

fine adjusting means for moving said focusing lens to a position corresponding to the distance.

3. (Amended) An automatic focusing mechanism for mounting on a measuring device having a telescope for sighting a leveling rod with pattern marks marked thereon at an equal pitch between each mark, and a photoelectric device for converting an image sighted by said telescope into an electric signal with a set range to thereby automatically adjust a focus on the leveling rod, said mechanism comprising:

driving means for moving a focusing lens of said telescope to a predetermined position within a movable range of said focusing lens;

pitch computing means for obtaining the pitch of the pattern marks of only a portion of the leveling rod on said photoelectric device to obtain a distance to the leveling rod based on the pitch obtained by said pitch computing means, without scanning a targeted area for focusing; and

fine adjusting means for moving said focusing lens to a position corresponding to said distance.